Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) The probe as claimed in claim 6, wherein ~~A probe for use in an atomic force microscope or for nanolithography, the probe comprising a force sensing member connected to a probe tip having a tip radius of 100nm or less such that~~ the probe includes a biasing element which is responsive to a substantially deflection-independent externally applied force ~~for urging either or both of the probe tip and a sample towards each other~~.

2. (Previously Presented) The probe as claimed in claim 1, wherein the biasing element comprises a magnetic element responsive to an externally applied magnetic force.

3. (Previously Presented) The probe as claimed in claim 2, wherein the magnetic element is mounted on the force sensing member adjacent the tip.

4. (Previously Presented) The probe as claimed in claim 1, wherein the biasing element comprises an electrically conductive member adapted for connection to one terminal of a power supply for applying a voltage potential between the probe and the sample.

5. (Previously Presented) The probe as claimed in claim 4, wherein the biasing element is provided adjacent the probe tip.

6. (Currently Amended) A probe for use in an atomic force microscope ~~or for nanolithography~~, the probe comprising a force sensing member connected to a probe tip having a tip radius of 100nm or less wherein the force sensing member has a low quality factor for one or more vibrating modes of the force sensing member and ~~such that~~ the probe is further adapted such that, when subject to an externally applied force, a biasing force urges either or both of the probe tip and a sample towards each other with magnitude greater than a restoring force arising from a displacement of the probe tip as it probes the sample.

7. (Canceled)

8. (Currently Amended) The probe as claimed in claim ~~7~~6, wherein the force sensing member ~~including~~ includes a damping element adapted to dissipate energy that would otherwise be mechanically stored in the force sensing element through excitation of one or more oscillatory modes.

9. (Previously Presented) The probe as claimed in claim 8, wherein the damping element comprises a coating of a mechanical-energy absorbing material on at least one side of the force sensing element.

10. (Previously Presented) The probe according to claim 9, wherein the energy-absorbing material is a polymer film.

11. (Previously Presented) The probe according to claim 10, wherein the polymer film is formed of a copolymer with majority component that is an amorphous rubber and a minority crystalline or glassy component.

12. (Previously Presented) The probe according to claim 10, wherein the force sensing member is coated with polymer by solution casting.

13. (Previously Presented) The probe according to claim 8, wherein the damping element is provided by a region of the force sensing member having controlled spring constant.

14. (Previously Presented) An atomic force microscope for imaging a sample in accordance with an interaction force between the sample and a probe, the microscope comprising

a driving means arranged to provide relative scanning motion between the probe and the sample surface and capable of bringing the sample and probe into close proximity, sufficient for a detectable interaction to be established between them; and

a probe detection mechanism arranged to measure deflection and / or displacement of the probe;

wherein the microscope includes the probe of claim 6.

15. (Previously Presented) The atomic force microscope as claimed in claim 14, further comprising a resonant oscillator mechanically coupled to either the probe or a sample stage for causing relative oscillatory movement between the probe and the sample.

16. (Currently Amended) An atomic force microscope for imaging a sample in accordance with an interaction force between the sample and a probe with a low quality factor, the microscope comprising

a driving means arranged to provide relative scanning motion between the probe with the low quality factor and the sample surface and capable of bringing the sample and probe into close proximity, sufficient for a detectable interaction to be established between them; and

a probe detection mechanism arranged to measure deflection and / or displacement of the probe;

wherein the microscope includes force generating means arranged such that, in operation, a force is applied to either or both of the sample and the probe or between the sample and the probe, the force being directed so as to urge the probe towards the sample or *vice versa*.

17. (Previously Presented) The microscope according to claim 16, wherein the force has a magnitude that is substantially independent of the degree of deflection of the probe.

18. (Currently Amended) The microscope according to claim 17, wherein the probe has spring constant and the probe properties and the applied force are selected such that, at least within a predetermined timescale, the applied force is greater than the restoring force provided by a deflection [[*x*]] of the probe as it scans the surface of the sample.

19. (Previously Presented) The microscope according to claim 18, wherein the probe has spring constant that is less than 1 Nm^{-1}.

20. (Previously Presented) The microscope according to claim 16, wherein the force generating means comprises a magnet and a magnetic element incorporated in the probe.

21. (Previously Presented) The microscope according to claim 16, wherein the force generating means comprises means for applying an attractive biasing voltage between the probe tip and the sample.

22. (Previously Presented) The microscope according to claim 16, wherein the force generating means comprises a sample environment which encourages the formation of a capillary neck between the probe and the sample, the capillary neck providing said applied force.

23. (Previously Presented) The microscope according to claim 22, wherein the force generating means further comprises a hydrophilic surface on said probe.

24. (Canceled)

25. (Currently Amended) The microscope according to claim ~~24~~16, further comprising means for immersing the probe and sample in a liquid during operation of the microscope.

26. (Currently Amended) The microscope according to claim ~~24~~16, wherein ~~the~~a force sensing element of the probe includes a damping element adapted to dissipate energy that would otherwise be mechanically stored in the force sensing element through excitation of one or more oscillatory modes.

27. (Previously Presented) The microscope according to claim 26, wherein the damping element comprises a coating of a polymeric material on at least one side of the force sensing element.

28. (Previously Presented) The atomic force microscope as claimed in claim 16, further comprising a resonant oscillator mechanically coupled to either the probe or a sample stage for causing relative oscillatory movement between the probe and the sample.

29. (Currently Amended) A method of collecting image data from a scan area of a sample with nanometric features wherein the method comprises the steps of:

(a) moving a probe having a force sensing element with a tip having a tip radius of 100nm or less into close proximity with a sample in order to allow an interaction force to be established between probe and sample;

(b) causing a substantially deflection-independent force to be established between sample and probe such that the probe is urged to move towards the sample or *vice versa*;

(c) scanning either the probe across the surface of the sample or the sample beneath the probe whilst providing a relative motion between the probe and sample surface such that an arrangement of scan lines covers the scan area, and dissipating energy which otherwise would be stored in the force sensing element through excitation of oscillatory modes;

(d) measuring deflection and / or displacement of the probe; and

(e) processing measurements taken at step (d) in order to extract information relating to the nanometric structure of the sample.

30. (Canceled)

31. (Currently Amended) The method as claimed in claim ~~30~~29, wherein the relative motion between the probe and the sample surface under step (c) is provided by a resonant oscillator.

32. (Currently Amended) A scanning probe microscope for writing information to a sample by means of an interaction between the sample and an AFM cantilever probe with a low quality factor, the microscope comprising

a driving means arranged to provide relative scanning motion between the probe <u>with the low quality factor</u> and the sample surface and capable of bringing the sample and probe into close proximity; and

a probe writing mechanism arranged to vary intermittently, typically on a timescale shorter than one scan line, the strength of the interaction between the probe and the sample and so to change intermittently a property of the sample surface in the locality of the probe;

wherein the microscope includes force generating means arranged such that, in operation, a substantially deflection-independent force is applied to either or both of the sample and the probe or between the sample and the probe, the force being directed so as to urge the probe towards the sample or *vice versa*.

33. (Previously Presented) The microscope as claimed in claim 32, wherein the relative motion between the probe and the sample surface is provided by a resonant oscillator.